January 31, 2003

Mr. Gary Flamm
California Energy Commission
Sacramento, CA

Dear Gary:

I would like to address the issue of the requirement that luminaires of 175W and higher, used in hardscape or parking lot applications, must be cutoff or full cutoff. I am not aware of any formal, published (or even informal and unpublished) studies that can tell us what is an acceptable luminaire brightness or luminance under outdoor nighttime conditions. We do know that the sensation of glare also depends on where in the field of view the source is and how large it is, not just its luminance (measured brightness) and the luminance ratio with its background.

Luminaires with little or no sideways light will not illuminate vertical surfaces, including buildings, 3-dimensional objects and people, as well as luminaires can that have carefully directed sideways light.

Many applications require much more than illuminance on the ground, including pathways for pedestrians and bikes, and parking lots with both pedestrians and vehicles. Safety, security, and face recognition are all important here. In many areas where people congregate, a totally different kind of ambience is desired. The higher target illuminances, higher adaptation level, and greater environmental (volumetric) brightness that are called for would be difficult to achieve with a system consisting of cutoff luminaires. In addition, many projects just don't have the budget for two lighting systems, namely one that performs and one that is decorative only.

It is my contention that we can go to 250W and semi-cutoff and still have good visibility, avoiding glare and allowing for 3-dimensional lighting. Not just ground lighting. A few manufacturers make luminaires that are both decorative and performance in nature, with well designed optics that limit the very-high-angle brightness. Using 250W allows poles to be higher and spaced farther apart. Using semi-cutoff optics allows a broad light distribution and lighting of faces and vertical surfaces without high-angle glare.

Remember, in order for luminaires to light a person's face, light has to

reach that person's face. If light is reaching the face, it is likely reaching the eyes also. Light that travels directly from the luminaire to the face, without reflecting off of something else first is most effective at lighting the face. If it's too much, we have glare. If, however, we eliminate light in the direction of eyes, we nearly eliminate face illumination. Somewhere in between those two extremes we can have face lighting without glare.

There are always so many criteria that a lighting designer/specifier has to weigh in making decisions about the details of the design, the equipment, the layout, etc. As with indoor lighting design, it is truly a balancing act. In the absence of good data for outdoor visibility conditions, let's not excessively tie the lighting designer's hands and eliminate design tools and methods. Cutoff luminaires are fine for some applications, but others require or would benefit from a different approach. By way of analogy, indirect lighting is very nice indoors -- very comfortable, no reflections in VDTs -- but it isn't the best solution for all indoor applications.

Gary, please include these comments in the public record on the proposed outdoor standards. Unfortunately, I may not be able to attend the February 4, 2003, workshop. In that event, would it be possible for someone to read them for me and for the CEC and/or its contractors to respond?

Most sincerely,

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